

7 MTCA and SEPA Evaluation of Remedial Alternatives

This section evaluates each of the proposed remedial alternatives with respect to threshold and other requirements for cleanup actions set forth in MTCA, Ch. 70.105D(WAC 173-340-360) and significant adverse environmental impacts, mitigation measures, and unavoidable adverse environmental impacts, as required by SEPA, Chapter 43.21 RCW (WAC-197-11-400). Integration of the MTCA and SEPA evaluations is encouraged by Ecology (WAC 197-11-262). A draft *Guide for the Integration of MTCA with SEPA* (Ecology, 2002a) was also consulted for the following discussion.

The requirements of MTCA and SEPA against which the alternatives are evaluated are first described in Sections 7.1 and 7.2, respectively. The action and No Action alternatives are evaluated against MTCA and SEPA requirements in Sections 7.3 to 7.12. A comparative summary of the alternatives evaluation and a substantial and disproportionate cost analysis of the alternatives are provided in Sections 7.13 and 7.14 respectively.

7.1 MTCA Requirements for Remedial Alternatives

Cleanup actions selected under MTCA must meet several requirements that address multiple factors in addition to the overarching goal of protecting human health and the environment. These requirements include threshold requirements and “other requirements” per WAC 73-340-360(2)(a) and (b) and as summarized in the following subsections. WAC 173-340-360(2)(c) through (h) minimum requirements were considered in developing the alternatives. The remedial alternatives are evaluated against these requirements in Sections 7.3 to 7.12. The final selection of a cleanup action will be based on the requirements of WAC 173-340-360(2). This complete analysis is provided in Section 8.

7.1.1 Threshold Requirements

WAC 173-340-360(2)(a)) lists four threshold requirements for cleanup actions. All cleanup actions must:

- Protect human health and the environment
- Comply with cleanup standards
- Comply with applicable state and federal laws
- Provide for compliance monitoring

All of the alternatives presented in Section 6.4.2 (except No Action) are designed to meet these threshold requirements, as described below.

7.1.1.1 Protect Human Health and the Environment and Comply with Cleanup Standards

The SW alternatives protect human health and the environment by meeting cleanup standards for groundwater at a conditional point of compliance where groundwater discharges to the Skykomish River (Table 7-1). All free product will be removed, petroleum discharges to the river will be eliminated, and surface soil contamination of the rail yard will be removed. Upland soil and groundwater between the rail yard and river will continue to exceed cleanup levels. Protection is achieved through containment (protective soil cap), institutional controls, and a long-term maintenance and monitoring program. Adverse impacts on the built and natural environment and potential mitigation measures are discussed in Section 7.4-7.7.

The PB alternatives meet groundwater standards at the railyard property boundary, another potential conditional point of compliance. All free product will be removed, petroleum discharges to the river and Maloney Creek will be eliminated, surface contamination on the rail yard will be removed and groundwater between the rail yard and river will be restored. Adverse impacts on the built and natural environment and potential mitigation measures are discussed in Section 7.8-7.11.

Subsurface soil on and off the rail yard will continue to exceed cleanup levels. Protection with respect to this material is achieved through containment, institutional controls and a long-term maintenance, inspection and monitoring program

The standard (STD) alternative achieves protection by meeting cleanup levels throughout the site for all media (sediment, groundwater, soil and surface water). Sediment cleanup is attained through some combination of natural recovery, removal, and enhanced bioremediation. All free product and contaminated soil is removed. Groundwater is restored to drinking water quality through natural attenuation following free product and soil removal. No long-term maintenance, inspection and monitoring program is required. Adverse impacts on the built and natural environment and potential mitigation measures are discussed in Section 7.12.

7.1.1.2 Comply with State and Federal Laws

Compliance with applicable state and federal laws is ensured, in part, through selection of the numeric cleanup levels (Section 5) that protect air, groundwater, surface water, and soil quality. Aside from cleanup levels, compliance must also be ensured in the manner by which prospective remedial alternatives are implemented. As described in Section 5, there are numerous laws and associated regulations that influence how any particular remedial action is implemented. Permitting by federal agencies, substantive standards promulgated by state and local agencies, best management

practices, workplace safety, and off-site waste disposal practices are just a few of the aspects that must be formally addressed in the design and implementation phases of a cleanup action to ensure compliance with applicable laws. None of the alternatives possess features that cannot be designed and implemented in full compliance with these laws.

7.1.1.3 Provide for Compliance Monitoring

Compliance monitoring refers to the collection, analysis, and reporting of environmental data to determine the short and long-term effectiveness of the cleanup action and whether protection is being achieved in accordance with the cleanup objectives. Compliance monitoring plans are developed in conjunction with the Cleanup Action Plan and typically involve standard field techniques and laboratory analytical methods. All of the remedial alternatives presented in Section 6 include comprehensive compliance monitoring plans that fulfill the requirements of WAC 173-340-410.

7.1.2 MTCA “Other Requirements”

Under MTCA, alternatives that meet the threshold requirements described above must also meet the following “other requirements” (WAC 173-340-360(2)(b)):

- Use permanent solutions to the maximum extent practicable
- Provide for a reasonable restoration time frame
- Consider public concerns

As the remedial alternatives were all designed to meet threshold requirements (except for No Action), the evaluation of remedial alternatives presented in this section focuses primarily on these other requirements that are described below. Table 7-2 is a compilation of relevant evaluation outcomes for each of the “Other Requirements” of cleanup actions under MTCA.

7.1.2.1 Use Permanent Solutions to the Maximum Extent Practicable

MTCA specifies that, when selecting a cleanup action, preference shall be given to actions that are “permanent to the maximum extent practicable.” Multiple approaches to cleanup are possible for this site. Selecting one that is permanent “to the maximum extent practicable” requires the weighing of costs and benefits. MTCA defines this balancing as a “substantial and disproportionate cost analysis” (WAC 173-340-360(3)(e)). The analysis can be both quantitative (e.g., degree of hazardous substance volume or mass reduction, costs) and qualitative (e.g., overall protectiveness, implementability, consideration of public concerns). Section 7.14 presents a substantial and disproportionate cost analysis for the remedial alternatives presented in this FS/EIS. The alternatives span a broad range of costs and

have widely varying impacts on the community and environment. Often, however, the alternatives afford only incremental or minor degrees of protection and permanence.

One important measure of permanence is the degree to which an alternative reduces the mass or toxicity of contamination present. All of the alternatives (except No Action) remove soil contaminated with metals and thus are equivalent in this regard. Hydrocarbons (in soil and as free product) are the majority contaminants at the site, removal or treatment of hydrocarbons is a useful measure of permanence with which to differentiate the alternatives.

In Section 8, an “equivalent soil volume” removed or treated is calculated for each alternative as a surrogate for hydrocarbon mass and permanence. An equivalent volume is a normalized or weighted volume based on the level of contamination and defined as follows:

- Free product volume ($\text{yd}^3 \times 10$)
- Remediation level soil volume ($\text{yd}^3 \times 5$)
- Other soil (i.e., below remediation level; $\text{yd}^3 \times 1$)

The remediation level for soil is roughly equivalent to a TPH concentration of 10,000 mg/kg. “Other Soil” refers to material ranging in TPH concentration from the cleanup level to the remediation level. Thus, 1 cubic yard of soil in the smear zone containing free product is weighted by a factor of 10 compared with, for example, vadose zone soil that is above the cleanup level but below the approximate remediation level of 10,000 mg/kg. Soil containing metals was assigned a weighting factor of 1.

7.1.2.2 Provide for a Reasonable Restoration Time Frame

A reasonable restoration time frame is another requirement for evaluating alternatives. MTCA places a preference on those alternatives that, while equivalent in other respects (e.g., permanence, implementation risks to the community and environment, costs) can be implemented in a shorter period of time. Thus, while all of the alternatives (except No Action) attain cleanup standards, they vary in the time required to do so.

7.1.2.3 Community Concerns

Community concerns are considered by Ecology in the selection of cleanup actions and are formally obtained during required Public Notice and Participation periods per WAC 173-340-600. Community concerns have been gauged informally as discussed in Appendix A. This FS/EIS will undergo a formal public comment period to solicit comments from the community on the proposed remedial alternatives after the document has been revised to incorporate Ecology feedback.

Issues of particular interest and concern to the community of Skykomish include the prospects for significant disruptions and disturbances (e.g., noise, traffic, temporary relocation of residents and structures) that could attend a cleanup action. In addition, the community has expressed concerns over the potential duration and effectiveness of cleanup actions, protection of the environment, protection of public health, public facilities such as the school, water supply, septic waste treatment and disposal, the local economy, and property values. While some of the socio-economic concerns of the community are not directly addressed through MTCA or SEPA, the alternatives presented in this document span a range of actions that attempt to balance the concerns already expressed by the community with other MTCA and SEPA factors such as permanence, effectiveness, restoration time frame, and avoiding or mitigating adverse impacts on the built and natural environment.

7.2 SEPA Requirements for Remedial Alternatives

Ecology and BNSF have agreed that cleanup of the site will have probable significant adverse impacts on the environment (Ecology, 2002). Ecology and BNSF identified the following areas for discussion in the EIS often soliciting public and agency comments:

- Impacts on health, safety, and welfare of the people in the town of Skykomish
- Impacts on fish and wildlife in the Skykomish River and Maloney Creek
- Impacts on the built environment, including buildings, roads and utilities
- Impacts on natural resources such as wetlands, groundwater and surface water

A summary of the SEPA impact analysis for the cleanup alternatives is presented in Table 7-3. Significant impacts are denoted with a “+” in Table 7-3 and presented for each alternative. Table 7-4 presents the basis for assigning adverse impacts. In general, adverse impacts, which are “more than moderate,” are considered significant adverse impacts (WAC 197-11-794). Adverse impacts that are “likely or reasonably likely” are considered “probable” and those that are “remote or speculative” are not. A more-detailed discussion of adverse impacts, organized by type of impact, is presented in Appendix A. See Table 7-3 or 7-4 for the explanation for the codes presented in the SEPA impact summaries for each alternative.

The discussion in the following sections also addresses proposed mitigation measures and whether an impact is an unavoidable, significant adverse impact. Table 7-5 summarizes unavoidable significant adverse impacts. In general, short-term impacts can reasonably be mitigated. Long-term impacts are more likely to be unavoidable, or require extensive mitigation efforts that may not be reasonable.

7.3 No Action Alternative

A No Action alternative is required as part of the FS/EIS. This alternative includes continued use of the existing barrier wall and associated free product skimming system. This system (wall and skimmers) is collecting free product at the site at the leading edge of the plume and should ultimately result in the cessation of seeps to the Skykomish River. A dust suppressant will continue to be applied to metals-impacted surface soils on the railyard to minimize airborne exposures. Oil recovery booms will continue to be maintained along the River to recover oil. Long-term groundwater monitoring will also be performed. The alternative will not restore groundwater or sediment quality in Maloney Creek and the River. Further, the alternative will not fully protect people or ecological receptors from exposure to surface or subsurface contamination. The No Action alternative will effectively satisfy the MTCA requirement to collect free product.

No Action would not significantly affect the built environment. No roads, buildings or utilities would be physically damaged or disrupted. The long-term presence of contamination could deter future investment in the built environment and the community. The natural environment would continue to be significantly and adversely impacted by the contamination present.

7.4 Alternative SW1

Alternative SW1 consists of:

- Enhancing bioremediation in the Levee Aquatic Resource Zone
- Monitoring natural attenuation in the Former Maloney Creek Aquatic Resource Zone
- Monitoring attenuation in the NE Developed Zone
- Excavating free product, excavating surface TPH and monitoring natural attenuation in the South Developed Zone
- Excavating surface metals, maintaining the barrier wall and recovery system, and monitoring natural attenuation in the NW Developed Zone

- Excavating surface metals, capping, skimming free product, and monitoring natural attenuation in the Railyard Zone

7.4.1 Model Toxics Control Act

Protection of human health is achieved in the short-term (less than 1 year) through excavation of surface soil containing metals and implementation of institutional controls. Soil exceeding the cleanup level remains in place across much of the site and is isolated from the ground surface by a protective layer of clean soil (or ballast on the railyard). Enhanced bioremediation and natural attenuation of free product between the barrier wall and the river achieve groundwater cleanup levels at the conditional point of compliance within 10 years. Natural recovery returns sediments to protective levels in less than 10 years. Threshold requirements are met after free product is recovered site wide, a process likely to take more than 30 years to complete.

SW1 is implementable from both a technical and administrative standpoint. Further, short-term risks during implementation are minor and manageable using standard methods and procedures for protecting workers and the community. Access agreements to private property are needed for monitoring.

Protection of human health is achieved by free product and removal/disposal of surface soil containing metals. Isolation of soil exceeding cleanup levels and institutional controls to prevent exposures to contaminated media (soil, free product, and groundwater) is not permanent. In the long term groundwater will achieve protective concentrations due to the removal of free product. However, protection with respect to these media is achieved through long-term maintenance, inspection and monitoring.

7.4.2 State Environmental Policy Act

The tabulation below summarizes the remediation activities the significant adverse impacts and mitigation measures. Refer to Table 7-3 and Appendix A for more detailed analysis and a comparison of significant impacts among alternatives.

Zone	SW1 Remediation Activity	Impacts/Mitigation
Aquatic Resource Zone – Levee	Biosparging (enhanced bioremediation)	Product seeps along levee will continue to be an impact until enhanced bioremediation takes effect Disturb levee riparian habitat and wildlife during implementation of enhanced bioremediation system / minimize disturbance by avoiding removing large trees, re-vegetate with native species Noise, traffic, limits on land use / limit work hours

Aquatic Resource Zone – Former Maloney Creek Channel	Monitoring natural attenuation	Long-term presence of contaminant sediment and potential discharge to groundwater may create impacts until natural recovery occurs No significant impacts expected from TPH in surface sediment, groundwater, or smear zone
Developed Zone – NE	Monitoring natural attenuation	Limits on land use Restriction of pumping of groundwater
Developed Zone – South	Excavating free product Excavating surface TPH Monitoring natural attenuation	Traffic / limit work hours Greater noise during working hours / limit work hours Loss of approx. 0.11 acres of topsoil, in part from residential gardens / replace topsoil in residential areas Dust / monitor dust and suppress dust, e.g. by applying water or dust suppressant during construction, covering railcar/truck loads Erosion and increased sediment loads in stormwater / divert stormwater from excavation & control runoff using hay bails, silt fences, sediment ponds, etc., work during dry season
Developed Zone – NW	Excavating surface metals Maintaining the barrier wall and recovery system, Monitoring natural attenuation	Traffic / limit work hours Greater noise during working hours / limit work hours, limit work around the school when in session Approx. 12.9 acres of topsoil lost / replaced by excavated soil Dust / monitor dust and suppress dust, e.g. by applying water or dust suppressant during construction, covering railcar/truck loads Erosion & increased sediment loads in stormwater / divert stormwater from excavation & control runoff using hay bails, silt fences, sediment ponds, etc., work during dry season
Railyard Zone	Excavating surface metals Capping Skimming free product Monitoring natural attenuation	Greater noise during working hours / limit construction to weekdays, limit work around the school when in session. Dust / monitor dust and suppress dust, e.g. by applying water or dust suppressant during construction, covering railcar/truck loads Erosion and increased sediment loads in stormwater / divert stormwater from excavation & control runoff using hay bails, silt fences, sediment ponds, etc., work during dry season

7.4.2.1 Levee and River Sediments

Adverse impacts to this zone are limited to minor and temporary impacts to levee riparian habitat and wildlife due to disturbances during the implementation of the enhanced bioremediation system, and minor impacts

from noise, traffic, and land use (institutional controls). Product seeps along the levee will continue to be a major impact until product remaining downstream of the barrier wall is addressed by enhanced bioremediation or is collected in the sorbent booms.

7.4.2.2 Former Maloney Creek Channel

No adverse impacts to this zone are expected as a result of natural attenuation. The benefits of this cleanup action would be realized after a long period of time. The long-term presence of impacted sediment and potential discharge to groundwater may create moderate impacts until natural recovery occurs. There is no data to indicate significant impact from TPH in surface sediment, groundwater or the smear zone. No damage would occur in the wetland due to construction.

7.4.2.3 Northeast Developed Zone

Minor impacts to this zone are expected on land use due to institutional controls. Another minor impact is the restriction of pumping of groundwater.

7.4.2.4 Northwest Developed Zone

Surface soil excavation to clean up metals results in adverse impacts including moderate impacts on traffic Noise impacts (greater than 60 dBA during working hours) will be unavoidable. Moderate but short-term impacts to soil (approximately 12.9 acres of topsoil lost) will be mitigated by replacement of excavated soil with comparable material. Minor or temporary impacts may occur to air quality, topography, flooding, runoff, habitat and wildlife, and aesthetics. The continued presence of free product will have a minor long-term impact in land use and public services due to institutional controls.

7.4.2.5 South Developed Zone

Excavation of free product and surface soil in this zone results in moderate impacts to traffic and noise (greater than 60dBA during working hours). No major adverse impacts are expected. Minor or temporary impacts may occur to soil (approximately 0.11 acres of topsoil, in part in residential gardens lost), topography, air quality, odors, flooding, runoff, groundwater quality and quantity, land use (institutional controls), wildlife and habitat, aesthetics, hazardous substances, and public services (utilities and/or septic tanks and leach fields). Contaminated soil above cleanup levels will continue to be present under this alternative but is not a major impact due to the depth of contamination, the availability of public water and implementation of institutional controls which will limit exposure and provide a mechanism for BNSF to manage contaminated soil and water generated during construction activities on affected properties.

7.4.2.6 Railyard

Moderate impacts from noise (greater than 60 dBA during construction) may be expected. No significant major impacts are expected. Minor or temporary impacts in this zone include topography (due to temporary soil piles), air quality (due to emissions from excavation equipment), odors, runoff (impacts due to trenching), habitat and wildlife, land use (institutional controls), transportation, and traffic. There are no significant impacts resulting from the continued presence of free product, as the skimming system will reduce migration off the railyard.

7.4.2.7 Proposed Specific Mitigation Measures

Proposed specific mitigation measures include standard construction best management practices (BMPs) for the protection of soil and water, air quality, fish and wildlife, vegetation, aesthetic and historical resources, human health and public property, including construction timing restrictions, implemented under all alternatives. In addition, replacement of excavated soil mitigates for soil impacts in the developed areas. Specific mitigation measures are provided in the tabulation above.

Impacts on land use from contaminated soil and groundwater can be mitigated by maintaining a clean soil cover at the surface, continuing to make public water available, and implementing institutional controls which will limit exposure and provide a mechanism for BNSF (or the Town with technical and financial assistance from BNSF) to safely manage contaminated soil and water encountered during construction activities on private and public properties.

7.4.2.8 Unavoidable Significant Adverse Impacts of Alternative SW1

Unavoidable significant impacts of Alternative SW1 include increased truck traffic in the town of Skykomish and on U.S. 2. Local truck traffic is estimated at 40 truck trips for each of 2 days around town. There would be approximately 4-8 days of increased truck traffic (defined for the purposes of the FS/EIS as 50-100 truck trips per day resulting in an increase of approximately 2.1-4.2% in traffic) along U.S. 2. There would also be relatively high noise levels in town during working hours.

7.5 Alternative SW2

Alternative SW2 consists of:

- Enhancing bioremediation in the Levee Aquatic Resource Zone
- Monitoring natural attenuation in the Former Maloney Creek Aquatic Resource Zone

- Monitoring attenuation in the NE Developed Zone
- Excavating free product, excavating surface TPH and monitoring natural attenuation in the South Developed Zone
- Installing free product recovery trenches, excavating surface metals and monitoring natural attenuation in the NW Developed Zone
- Excavating surface metals, capping, skimming free product, recovering free product with trenches and monitoring natural attenuation of groundwater in the Railyard Zone

7.5.1 Model Toxics Control Act

The MTCA evaluation of Alternative SW2 is nearly equivalent to that for SW1 because of the minor technical differences between the two alternatives. With SW2, free product removal time decreases because of the greater number and density of free product recovery elements (trenches and well-based recovery equipment).

Access agreements to private property are needed to service and monitor free product recovery equipment.

As with SW1, protectiveness of human health is achieved by removal/disposal of surface soil containing metals. Isolation of subsurface soil exceeding cleanup levels and institutional controls to prevent exposures to contaminated media (soil, free product and groundwater) are effective but lack permanence and long-term protectiveness, as defined by MTCA.

7.5.2 State Environmental Policy Act

The tabulation below summarizes the significant adverse impacts described in the text as major or unavoidable for this alternative. In general, the impacts are very similar to those previously described for Alternative SW1. Exceptions are noted below for the NE Developed Zone, the NW Developed Zone, and the Railyard Zone. See Table 7-3 and Appendix A for more details and a comparison among alternatives. The tabulation below summarizes the remediation activities, significant impacts and mitigation measures, described in the text.

Zone	SW2 Remediation Activity	Impacts / Mitigation
Aquatic Resource Zone – Levee	Same as SW1	Same as SW1
Aquatic Resource Zone – Former Maloney Creek Channel	Same as SW1	Same as SW1
Developed Zone – NE	Same as SW1	Same as SW1
Developed Zone – South	Same as SW1	Same as SW1
Developed Zone – NW	Same as SW1, except: Installing free product recovery trenches (instead of maintaining the barrier wall)	Same as SW1, with this addition: Trench work for free product recovery products additional impacts to odors, roads, and temporary housing inconvenience for residents. Odors & housing disruption / provide temporary housing for affected residents Road blockages / setup work areas to ensure emergency vehicle access and alternate routes Safety / ensure no public access to work areas, secure areas when unattended
Railyard Zone	Same as SW1, but adds: Recovering free product with trenches	Same as SW1 (additional free product skimming in the interior of the railyard does not significantly increase impacts)

7.5.2.1 Northeast Developed Zone

Minor impacts to this zone are expected on land use due to institutional controls. Another minor impact is the restriction of pumping of groundwater.

7.5.2.2 Northwest Developed Zone

Adverse impacts to this zone are similar to those for Alternative SW1. Trench work for free product recovery results in additional minor or temporary impacts to odors, roads, and housing (temporary inconvenience for residents). Trench installation would be expected to increase the efficiency and rate at which the free product is recovered.

7.5.2.3 Railyard

The additional free product skimming in the interior of the railyard does not lead to different or substantially more extensive impacts than described for Alternative SW1.

7.5.2.4 Proposed Specific Mitigation Measures

Proposed specific mitigation measures include standard construction BMPs for the protection of soil and water, air quality, fish and wildlife, vegetation, aesthetic and historical resources, human health and public property, including construction timing restrictions, implemented under all alternatives. In addition, replacement of excavated soil mitigates for soil impacts in the developed areas. In addition to the mitigation measures identified in Section 7.4, specific mitigation measures are presented in the tabulation above.

7.5.2.5 Unavoidable Significant Adverse Impacts of Alternative SW2

Unavoidable significant impacts of Alternative SW2 include:

- Increased truck traffic in the town of Skykomish
- 4-8 days of increased truck traffic on U.S. 2
- Relatively high noise levels in town during working hours.

7.6 Alternative SW3

Alternative SW3 consists of:

- Excavating or pressure grouting free product, excavating sediment to remediation levels and enhancing bioremediation in the Levee Aquatic Resource Zone
- Monitoring natural attenuation in the Former Maloney Creek Aquatic Resource Zone
- Enhancing biodegradation in the NE Developed Zone
- Excavating free product, excavating surface TPH, and monitoring natural attenuation in the South Developed Zone
- Excavating free product where accessible, excavating surface metals and monitoring natural attenuation in the NW Developed Zone
- Excavating surface metals, capping, skimming free product, recovering free product with trenches and monitoring natural attenuation in the Railyard Zone

7.6.1 Model Toxics Control Act

This alternative increases permanence and protectiveness over the previous alternatives (SW1 and SW2) by excavating free product in the NW Developed Zone (where accessible), excavating or solidifying free product in the levee,

removing contaminated sediments from the Skykomish River, and free product treatment in the NE Developed Zone using enhanced bioremediation. Free product remaining after excavation is prevented from reaching the Skykomish River by the existing barrier wall and passive recovery systems (trenches and skimmers).

Access agreements are needed to excavate and monitor on private property. Disruption to the community occurs as a result of excavation work near homes and other infrastructure. Temporary road and utility service disruptions are likely.

This alternative reduces the restoration time frame relative to previous alternatives, for attainment of sediment and groundwater cleanup levels at the off-property, conditional point of compliance at the levee. While increasing protectiveness and permanence with respect to free product removal, soil and groundwater are likely to remain above cleanup levels across most of the site in the long-term. As with SW1 and SW2, protection is ensured through institutional controls.

7.6.2 State Environmental Policy Act

Excavation in the NW Developed Zone and increased cleanup activity in the levee contribute to greater impacts on the natural and built environment from this alternative. The majority of impacts remain minor, temporary or moderate. See Table 7-3 and Appendix A for more details and a comparison among alternatives. The tabulation below summarizes the remediation activity, significant impacts described in the text, and proposed mitigation measures.

Zone	SW3 Remediation Activity	Impacts / Mitigation
Aquatic Resource Zone – Levee	Same as SW2, adding: Excavating or pressure grouting free product Excavating sediment to remediation levels	Impacts and mitigation same as SW2, adding: Greater noise during working hours Construction of access roads / provide stormwater & sediment control with silt fences, hay bales, etc Traffic Loss of topsoil on levee / replace and replant with native vegetation Possible use of coffer dam / conduct work during dry season when river level is low and work area is dry Riparian vegetation removal resulting in temporary reduction in salmonid habitat function / perform work during salmon window (July 1 – Sept. 15), only remove necessary vegetation, replant area with native species, re-establish or enhance existing topography

Aquatic Resource Zone – Former Maloney Creek Channel	Same as SW2	Same as SW2
Developed Zone – NE	Enhanced biodegradation	Wells located in the street / flush mount wells , Greater noise during working hours / limit work hours Rerouted utilities due to wells in street
Developed Zone – South	Same as SW2	Same as SW2
Developed Zone – NW	Same as SW2, except: Excavating the shallow smear zone	Impacts and mitigation same as SW2, adding: Trucks Loss of topsoil in residential yards and public areas / replace topsoil Greater noise during working hours Excavations near or adjacent to residences / shore when near excavation , Excavations in historic district / shore when near excavation, move buildings as necessary . Excavation of septic systems / provide temporary alternative sewage system Utilities (including water mains) disrupted and rerouted / reroute utilities prior to excavation to ensure no loss of service . Leach fields affected / provide temporary alternative sewage system, replace septic systems Runoff from clean and contaminated soils piles / cover and use run-on/off controls ,
Railyard Zone	Same as SW2	Same as SW2

7.6.2.1 Levee and River Sediments

Excavation of hot spots on the levee and/or solidification combined with limited sediment removal at seep locations results in moderate adverse impacts to noise (greater than 60 dBA during working hours), roads and transportation (access road), and traffic (trucks). No major adverse impacts are expected. Minor or temporary impacts may occur to soil (topsoil loss on levee); these impacts will be mitigated by replacement of excavated soil. Minor impacts may occur to topography, air emissions, odors, river hydrology (possible use of coffer dam), floods, runoff, water quality, habitat and wildlife, aquatic resources (riparian vegetation removal resulting in temporary reduction in salmonid habitat function), sediment, land use (institutional controls), aesthetics, and hazardous substance exposure.

7.6.2.2 Northeast Developed Zone

Enhanced bioremediation in this zone results in moderate adverse impacts to aesthetics (wells located in the street), noise (greater than 60 dBA during working hours), and public services (rerouted utilities from wells in the street). Minor or temporary adverse impacts may be expected for habitat and wildlife, land use (institutional controls), roads, and traffic.

7.6.2.3 Northwest Developed Zone

Excavation of accessible free product and surface soil may cause major adverse impacts to traffic. Moderate adverse impacts may occur to soil (loss of topsoil in residential yards and public areas); these effects will be mitigated by replacement of excavated soil. Moderate adverse impacts may occur to noise (greater than 60 dBA during working hours), housing (excavations near or adjacent to residences), aesthetic and historical structures (excavations in historic district), and public services (excavation of septic systems). Minor or temporary impacts may be expected to topography, air quality, odors, groundwater quality and quantity, flooding, runoff, land use (due to institutional controls), hazardous substance exposure, and habitat and wildlife (vegetation clearing and disturbance).

7.6.2.4 Proposed Specific Mitigation Measures

Proposed specific mitigation measures include standard construction BMPs for the protection of soil and water, air quality, fish and wildlife, vegetation, aesthetic and historical resources, human health and public property, including construction timing restrictions, implemented under all alternatives. In addition, replacement of excavated soil mitigates for soil impacts in the developed areas. In addition to the mitigation measures identified for alternative SW-2 proposed specific mitigation measures are described in the tabulation above.

7.6.2.5 Unavoidable Significant Adverse Impacts of Alternative SW3

Unavoidable significant impacts of Alternative SW3 include:

- Increased truck traffic in the town of Skykomish
- Increased truck traffic on U.S. Highway 2 for 16-32 days
- Temporary road closures
- Relatively high noise levels in town during working hours
- Effects to housing, historical structures, aesthetics and public services as a result of excavation in and near residential areas.

7.7 Alternative SW4

Alternative SW4 consists of:

- Ozone sparging, flushing or excavating soil and free product, excavating sediment to cleanup levels and enhancing bioremediation in the Levee Aquatic Resource Zone
- Enhancing bioremediation and excavating sediment to remediation levels in the Former Maloney Creek Aquatic Resource Zone
- Enhancing bioremediation in the NE Developed Zone
- Excavating all soil above cleanup levels in the South Developed Zone
- Excavating or flushing free product, excavating surface metals, excavating the shallow smear zone and monitoring natural attenuation in the NW Developed Zone
- Excavating surface metals and TPH, capping, skimming free product, recovering free product using trenches and monitoring natural attenuation in the Railyard Zone

7.7.1 Model Toxics Control Act

This alternative increases permanence and effectiveness over the previous alternative (SW3) by excavating or surfactant flushing all free product in the NW Developed Zone, removing shallow soil contamination in the NW Developed Zone (where accessible), removing near-surface, TPH-contaminated soil in the railyard and more aggressively attending to sediment impacts at the Skykomish River and Former Maloney Creek. Either excavation, ozone sparging or surfactant flushing are used at the levee to remediate free product and soil contamination. Both *in situ* technologies require testing to confirm effectiveness and implementability.

Access agreements are needed to excavate, surfactant flush, and monitor on private property. Disruption to the community occurs as a result of excavation work near homes and other infrastructure. Temporary road and utility service disruptions are likely.

This alternative reduces restoration time frames (relative to the previous alternatives), primarily with respect to attainment of cleanup levels at the Aquatic Resource Zones. Actions in the Former Maloney Creek have significant impacts on the natural environment (See SEPA analysis below) and may outweigh any benefit from restoration measures more aggressive than natural recovery.

Protectiveness and permanence are increased in the NW Developed Zone in that free product efficiency is greater (flushing can be used to remove free product from beneath structures). Nevertheless, soil and groundwater are likely to remain above cleanup levels across most of the site in the long-term. As with SW1, SW2 and SW3, protection is ensured through institutional controls.

7.7.2 State Environmental Policy Act

Excavation and surfactant flushing in the NW Developed Zone and increased cleanup activity in the Former Maloney Creek and Levee Zones contribute to greater impacts on the natural and built environment from this alternative. The majority of impacts remain minor, temporary or moderate. See Table 7-3 and Appendix A for more details and a comparison among alternatives. The tabulation below summarizes the remediation activities, significant impacts and proposed mitigation measures.

Zone	SW4 Remediation Activity	Impacts / Mitigation
Aquatic Resource Zone – Levee	Same as SW3, except: Ozone sparging or flushing instead of excavation or pressure grouting Excavating sediment to cleanup levels (instead of to remediation levels)	Impacts and mitigation same as SW3, adding: Groundwater quality may be impacted if flushing agents are used / control flushing agents, monitor water quality during activities and suspect if impacts occur.
Aquatic Resource Zone – Former Maloney Creek Channel	Enhancing bioremediation Excavating sediment to remediation levels	Clearing of approx. 0.5 acres of forested wetland habitat during excavation and an additional 0.4 acres for installation of air sparging wells / avoid removing mature trees, only clear necessary vegetation, revegetate with native wetland species, control sedimentation by conducting work during dry season and using BMPs for sediment control, compensatory mitigation Loss of sediment with slow natural recovery / reestablish or enhance pre-existing topography, mitigate wetland loss under Wetland Compensatory Mitigation Plan Greater noise during working hours / limit working hours Reduction in or temporary loss of access to salmonid habitat / restrict salmonid access to wetland until work and restoration is complete.
Developed Zone – NE	Same as SW3	Same as SW3

Developed Zone – South	Same as SW3, except: Excavating all soil above cleanup levels and not including monitored natural attenuation	Same as SW3, adding: One building affected / shore building during excavation Removal of part of developed habitat adjacent to wetland / reestablish habitat in accordance with applicable regulations
Developed Zone – NW	Same as SW2, except: Excavating free product where accessible (instead of recovery trenches)	Same as SW3, adding: Full excavation of all free product and excavation of shallow smear zone soil is worse case scenario Traffic / address dust by covering loads, using wheel washes, washing site roads as necessary. Public roads closed for lengthy periods / ensure alternate access for fire service access, temporarily re-house affected residents Large portions of school property affected / conduct activities during recess as much as possible, limit work around school when in session, provide access restrictions to work area, monitor air quality and use dust suppression as necessary. Remove large quantities of soil / replace soil with clean fill, restore areas consist with former use.
Railyard Zone	Same as SW3, adding: Excavating TPH as well as surface metals	Similar to SW2. Excavation of surface soils contaminated with TPH will slightly increase impacts over SW2.

7.7.2.1 Levee and River Sediments

Sediment excavation to cleanup levels and ozonation, flushing, or excavation of levee will result in moderate adverse impacts to noise (greater than 60 dBA during working hours), aquatic resources (removal of riparian vegetation and coarse substrates resulting in short-term loss of salmonid habitat), and roads (duration of excavation and well installation). No major adverse impacts are expected. Minor or short-term impacts may include topography, air quality, odors, groundwater quality (if flushing agents are used), wildlife and habitat, sediment, hydrology (use of coffer dam during low-flow period), floods, runoff, surface water quality, aesthetics, land use (institutional controls), hazardous substance exposure, and traffic.

7.7.2.2 Former Maloney Creek Channel

Major adverse impacts are expected as a result of sediment excavation to habitat and wetlands in Maloney Creek. Approximately 0.5 acre of forested wetland habitat would be cleared during excavation, and an additional 0.4 acres cleared for installation of air sparging wells. Moderate adverse

impacts are expected to sediment (loss of resource with slow natural recovery), noise (greater than 60 dBA during working hours), and aquatic resources. A reduction in salmonid habitat and temporary loss of access to salmonid habitat would occur as a result of removal of surface sediment and use of the cofferdam. In addition, minor or temporary impacts are likely for topography, former Maloney Creek hydrology, runoff, floods, traffic, and aesthetics.

7.7.2.3 Northwest Developed Zone

This alternative may include flushing, excavation or a combination of excavation and flushing of all free product. The worst case with respect to impacts to the community includes excavation of all free product (including under buildings) and excavation of shallow smear zone soil to cleanup levels. This worst case is the scenario evaluated here. Details regarding the impacts associated with flushing are available in Appendix A.

Major adverse impacts to aesthetic and historic buildings, traffic, and public services are likely, although less extensive than under the standard alternative. The volume of free product to excavate is less than that for the standard alternative. Utilities, including water mains, will be disrupted and rerouted due to the need to excavate in right-of-ways. Leach fields will be affected. Public roads will be closed off for lengthy periods. Large portions of the school property will be impacted. Moderate adverse impacts are likely for runoff (from clean and contaminated soils piles). Other adverse impacts are roads (frequency of truck trips), noise (greater than 60 dBA during working hours), housing (impacts are considerably reduced if excavation under buildings is avoided), and hazardous substance exposure (due to open excavations in populated areas with the potential for hydrocarbon contact). Minor or temporary impacts are likely for topography, air quality, odors, groundwater quantity and quality (under the flushing scenario), flooding, habitat and wildlife (vegetation clearing and disturbance), and land use (due to institutional controls).

7.7.2.4 South Developed Zone

Full excavation to cleanup levels for this zone results in major adverse impacts to traffic. Traffic impacts include 200 truck trips for 2 days (locally) and increased traffic along U.S. 2 to Everett for excavation of all impacted soil and free product.

Moderate adverse impacts may occur to noise (greater than 60dBA during working hours), housing (one building), and aesthetics. Impacts to aesthetics are due to the removal of part of the developed habitat adjacent to the wetland.

Minor or temporary impacts are likely to soil, topography, air quality, odors, groundwater quality and quantity, floods, runoff, wildlife and habitat, land use

(institutional controls), roads, public services, and hazardous substance exposure. With the exception of effects to land use due to institutional controls, these impacts will be offset through the implementation of construction best management practices.

7.7.2.5 Railyard

The impacts from this alternative are similar to those for SW2. The additional excavation of surface soils with TPH contamination will increase the extent of impacts somewhat over those described for SW2 without changing the overall impacts.

7.7.2.6 Proposed Specific Mitigation Measures

Proposed specific mitigation measures include standard construction BMPs for the protection of soil and water, air quality, fish and wildlife, vegetation, aesthetic and historical resources, human health and public property, including construction timing restrictions, implemented under all alternatives. In addition to the mitigation measures identified for SW-3, the tabulation above describes proposed specific mitigation measures for the impacts associated with the alternative. In addition, replacement of excavated soil mitigates for soil impacts in the developed areas. Affected septic systems in the developed zones can be mitigated by replacement of septic systems. Compensatory wetland mitigation would be detailed in a Wetland Mitigation Plan to off-set impacts to the former Maloney Creek channel wetlands consistent with the requirements of the Skykomish Critical Areas Ordinance and the U.S. Army Corps of Engineers regulations.

7.7.2.7 Unavoidable Significant Adverse Impacts of Alternative SW4

Unavoidable significant impacts of Alternative SW4 include:

- Increased truck traffic in the town of Skykomish
- Increased truck traffic on U.S. 2 lasting approximately 15-30 days
- Road closures
- Relatively high noise levels in town during working hours
- Temporary reduction in sediment and potential fish habitat in Former Maloney Creek side channel
- Increased risk of exposure to hazardous substances
- Housing (temporary relocation of some; nuisance for others)

- Historic structures (temporary relocation) and change of town character aesthetics and public services during excavation (water mains) in and near residential areas.

7.8 Alternative PB1

Alternative PB1 consists of:

- Enhancing bioremediation in the Levee Aquatic Resource Zone
- Monitoring natural attenuation in the Former Maloney Creek Aquatic Resource Zone
- Monitoring natural attenuation in the NE Developed Zone
- Excavating all soil above cleanup levels in the South Developed Zone
- Excavating free product where accessible, excavating surface metals and enhancing biodegradation in the NW Developed Zone
- Excavating surface metals, capping, skimming free product, recovering free product with trenches and monitoring natural attenuation in the Railyard Zone

7.8.1 Model Toxics Control Act

Alternative PB1 protects human health and the environment and meets cleanup standards through a combination of sediment natural recovery, excavation, enhanced bioremediation, passive free product recovery, isolation of subsurface contaminated soil and institutional controls.

Excavation of metals contaminated surface soil, accessible free product in the NW Developed Area, and soil in the South Developed Zone can be accomplished within a 2-year planning horizon. These elements of Alternative PB1 are both permanent and protective. Remaining soil in excess of cleanup levels is isolated below a protective clean soil layer and cannot be contacted except under controlled circumstances (as stipulated in institutional controls). While effective, these measures are not considered permanent and protective under MTCA.

Enhanced bioremediation promotes restoration of groundwater quality between the railyard and the point at which groundwater discharges to the Skykomish River. This may require a restoration time frame of up to 20 years in the NW Developed Zone depending on effectiveness and size of the system installed. Pending the outcome of bench and pilot testing, enhanced bioremediation is anticipated to be both permanent and effective as the

hydrocarbon contaminants are biodegradable, the technology is well developed, and system components are reliable.

7.8.2 State Environmental Policy Act

There is only one major impact to the natural and built environment associated with this alternative. In general, the minor, temporary or moderate impacts are very similar to those previously described for Alternative SW1. Exceptions are noted below for the NW Developed Zone and the Railyard Zone. See Table 7-3 and Appendix A for more details and a comparison among alternatives. The tabulation below summarizes remediation activities, the significant impacts and mitigation.

Zone	PB1 Remediation Activity	Impacts / Mitigation
Aquatic Resource Zone – Levee	Same as SW1 (biostarging)	Same as SW1
Aquatic Resource Zone – Former Maloney Creek Channel	Same as SW1 (monitoring natural attenuation)	Same as SW1
Developed Zone – NE	Same as SW1 (monitoring natural attenuation)	Same as SW1
Developed Zone – South	Same as SW4 (excavating all soil above cleanup levels)	Same as SW4
Developed Zone – NW	Excavating free product where possible Excavating surface metals Enhancing biodegradation	<p>Traffic / wash roads as necessary Impacts to Stormwater / divert stormwater from excavation, cover truck loads Disturbance of approx. 0.3 acres of soil in residential yards, schoolyard, garden areas / replace the soil and revegetate as necessary.</p> <p>Major excavations near existing structures, including homes / shore near excavations, replace septic systems, provide temporary housing, regrade after excavation Excavation in public areas / restrict access to work area Greater noise during working hours / limit work hours Impacts to roads and public services / stage work area to ensure emergency vehicle access Enhanced bioremediation will require wells in street, noise, and rerouted utilities</p>

Railyard Zone	Same as SW2 (excavating surface metals; capping; skimming free product; recovering free product with trenches; monitoring natural attenuation)	Same as SW2
----------------------	---	-------------

7.8.2.1 Northwest Developed Zone

Major adverse impacts to traffic are expected in this zone, due to the need for 200 truck trips per day for 7 weeks for local transport, and trucks for transport down U.S. 2 to Everett. This is in addition to truck trips required for the surface soil excavation. Moderate impacts to soil (disturbance of approximately 0.3 acre in residential yards, school yard, and other garden areas, equal to approximately 3,680 cy soil removed and replaced), housing (major excavations near existing structures), aesthetics (excavation in public areas), noise (greater than 60 dBA during working hours), roads, and public services were identified. Minor or temporary adverse impacts on topography, air quality, odors, groundwater quantity and quality, flooding, runoff, land use (imposition of institutional controls limiting excavation), habitat and wildlife, and hazardous substances were identified. Enhanced bioremediation in this zone results in moderate adverse impacts to aesthetics (wells located in the street), noise from well installation (greater than 60 dBA during working hours), and public services (rerouted utilities from wells in the street). Minor or temporary adverse impacts may be expected for habitat and wildlife, land use (institutional controls), roads, and traffic.

7.8.2.2 South Developed Zone

Adverse impacts to this zone are the same as those for Alternative SW4 and are associated with excavation and transport of contaminated soil. Full excavation to cleanup levels for this zone results in major adverse impacts to traffic. Traffic impacts include 200 truck trips for 2 days (locally) for excavation of all impacted soil and free product. Moderate adverse impacts may occur to noise (greater than 60 dBA during working hours), one residential garage, and aesthetics. Impacts to aesthetics are due to the removal or part of the developed habitat adjacent to the wetland. Minor or temporary impacts are likely to soil, topography, air quality, odors, groundwater quality and quantity, floods, runoff, wildlife and habitat, land use (institutional control), roads, public services, and hazardous substance exposure.

7.8.2.3 Proposed Specific Mitigation Measures

Proposed mitigation measures include standard construction BMPs for the protection of soil and water, air quality, fish and wildlife, vegetation, aesthetic and historical resources, human health and public property, including

construction timing restrictions, implemented under all alternatives. In addition, replacement of excavated soil with comparable material mitigates for soil impacts in the developed areas. Impacts to the septic systems in the developed zones can be mitigated by replacement of septic systems. Impacts on land use from contaminated soil and groundwater can be mitigated by maintaining a clean soil cover at the surface, continuing to make public water available, and implementing institutional controls which will limit exposure and provide a mechanism for BNSF (or the Town with technical and financial assistance from BNSF) to safely manage contaminated soil and water encountered during construction activities on private and public properties. Additional proposed specific mitigation measures are provided in the tabulation above.

7.8.2.4 Unavoidable Significant Adverse Impacts of Alternative PB1

Unavoidable significant impacts of Alternative PB1 include:

- Increased truck traffic in the town of Skykomish
- 17 - 34 days of increased truck traffic on U.S. 2
- Road closures
- Relatively high noise levels in town during working hours
- Effects to housing, historical structures, aesthetics and public services during excavation in and near residential areas.

7.9 Alternative PB2

Alternative PB2 consists of:

- Excavating or pressure grouting free product, excavating sediment to remediation levels and enhancing bioremediation in the Levee Aquatic Resource Zone
- Monitoring natural attenuation in the Former Maloney Creek Aquatic Resource Zone
- Enhancing biodegradation in the NE Developed Zone
- Excavating all soils above cleanup levels in the South Developed Zone

- Excavating, flushing, or a combination of flushing and excavating all free product, excavating surface metals and enhancing biodegradation in the NW Developed Zone
- Excavating surface metals, capping, skimming free product, recovering free product and enhancing biodegradation in the Railyard Zone

7.9.1 Model Toxics Control Act

Alternative PB2 builds on provisions of PB1 by increasing the amount of enhanced bioremediation for developed areas north of the railyard and by increasing the permanence and effectiveness of soil and sediment cleanup actions at the levee through selective removal (excavation) and grouting. PB2 addresses all free product, not just accessible free product.

The more aggressive removal or stabilization efforts (i.e., grouting) and removal of soil and free product at seep locations reduce the time required to restore sediment quality to protective levels. The greater enhanced bioremediation infrastructure, particularly in the NE Developed Zone, reduces the time required to restore groundwater quality. The complete removal of free product in the NW Developed Zone reduces the restoration timeframe for both soil and groundwater.

7.9.2 State Environmental Policy Act

Impacts associated with this alternative are very similar to those previously described for Alternative PB1. Exceptions are noted below for the applicable zones.

See Table 7-3 and Appendix A for more details and a comparison among alternatives. The tabulation below summarizes the remediation activities, significant impacts, and proposed mitigation of impacts.

Zone	PB2 Remediation Activity	Impacts / Mitigation
Aquatic Resource Zone – Levee	Same as SW3	Same as SW3
Aquatic Resource Zone – Former Maloney Creek Channel	Same as PB1 and SW1	Same as PB1 and SW1
Developed Zone – NE	Same as SW3 and SW4	Same as SW3 and SW4
Developed Zone – South	Same as PB1 and SW4	Same as PB1 and SW4

Developed Zone – NW	Same as PB1, except: Excavating or flushing free product (instead of excavating free product where possible)	Same as PB1, except for the following. Excavation under buildings and historic structures / <i>relocate then replace buildings, provide housing</i> Excavation under school / <i>relocate school, make alternative arrangements for schooling</i>
Railyard Zone	Same as PB1, except: Enhancing biodegradation (instead of monitoring natural attenuation)	Greater noise during working hours during well installation

7.9.2.1 Levee and River Sediments

Excavation of hot spots in the levee and/or solidification combined with limited sediment removal at seep locations results in moderate adverse impacts to noise (greater than 60 dBA during working hours), roads and transportation (access road), and traffic (trucks). No major adverse impacts are expected. Minor or temporary impacts may occur to soil (topsoil loss on levee), topography, air quality, odors, river hydrology (possible use of coffer dam), floods, runoff, water quality, habitat and wildlife, aquatic resources (riparian vegetation removal resulting in temporary reduction in salmonid habitat function), sediment, land use (institutional controls), aesthetics, and hazardous substance exposure.

7.9.2.2 Northwest Developed Zone

This alternative may include either flushing or excavation of all free product or a combination of excavation and flushing. The worst case with respect to impacts to the community includes excavation of all free product (including under buildings). This worst case is the scenario evaluated here. Details regarding the impacts associated with flushing are available in Appendix A.

Major adverse impacts are likely to aesthetic and historic buildings, traffic, and public services, although less extensive than under the standard alternative or alternative SW4. The volume of free product to excavate is less than that for the standard alternative and the shallow smear zone is not being excavated like in alternative SW4. Utilities, including water mains, will be disrupted and rerouted due to the need to excavate in right-of-ways. Leach fields will be affected. Public roads will be closed off for lengthy periods. Large portions of the school property will be impacted. Moderate adverse impacts are likely for runoff (from clean and contaminated soils piles). Construction best management practices mitigate this impact, and no unavoidable impacts are present. Other adverse impacts are roads (frequency of truck trips), noise (greater than 60 dBA during working hours), housing (impacts are considerably reduced if excavation under buildings is avoided),

and hazardous substance exposure (due to open excavations in populated areas with the potential for hydrocarbon contact). Minor or temporary impacts are likely for topography, air quality, odors, groundwater quantity and quality (under the flushing scenario), flooding, habitat and wildlife (vegetation clearing and disturbance), and land use (due to institutional controls).

7.9.2.3 Northeast Developed Zone

Enhanced bioremediation in this zone results in moderate adverse impacts to aesthetics (wells located in the street), noise (greater than 60dBA during working hours), and public services (rerouted utilities from wells in the street). Minor or temporary adverse impacts may be expected for habitat and wildlife, land use (institutional controls), roads, and traffic.

7.9.2.4 Railyard

No major adverse impacts are expected as a result of this alternative. A moderate impact to noise and vibrations is expected (greater than 60 dBA during working hours for well installation). Minor or temporary impacts are expected to soil, topography, air emissions, odors, runoff, habitat and wildlife, land use (institutional control), and traffic.

7.9.2.5 Proposed Specific Mitigation Measures

Proposed specific mitigation measures are similar to those described in Sec. 7.8.2.3 and include standard construction BMPs for the protection of soil and water, air quality, fish and wildlife, vegetation, aesthetic and historical resources, human health and public property, including construction timing restrictions, implemented under all alternatives. In addition, replacement of excavated soil with comparable material mitigates for soil impacts in the developed areas. Replacement of septic systems can mitigate impacts to leach fields in the developed zones. Impacts on land use from contaminated soil and groundwater can be mitigated by maintaining a clean soil cover at the surface, continuing to make public water available, and implementing institutional controls which will limit exposure and provide a mechanism for BNSF (or the Town with technical and financial assistance from BNSF) to safely manage contaminated soil and water encountered during construction activities on private and public properties.

7.9.2.6 Unavoidable Significant Impacts of Alternative PB2

Unavoidable significant impacts of Alternative PB2 include:

- Relatively high noise levels in town during working hours
- Increased truck traffic in the town of Skykomish
- 19-38 days of increased truck traffic on U.S. 2

- Road closures
- Effects to public services, school, community center, post office, housing, historic structures, and aesthetics

7.10 Alternative PB3

Alternative PB3 consists of:

- Ozone sparging or flushing, excavating sediment to cleanup levels and enhancing bioremediation in the Levee Aquatic Resource Zone
- Enhancing biodegradation and excavating sediment to remediation levels in the Former Maloney Creek Aquatic Resource Zone
- Enhancing biodegradation in the NE Developed Zone
- Excavating all soils above cleanup levels in the South Developed Zone
- Excavating or flushing free product, excavating surface metals, excavating the shallow smear zone and enhancing biodegradation in the NW Developed Zone
- Excavating surface metals and TPH, capping, recovering free product with trenches, flushing and enhancing biodegradation in the Railyard Zone

7.10.1 Model Toxics Control Act

Alternative PB3 builds on provisions of PB2 primarily by reducing the restoration time frame for the Aquatic Resource Zones. More aggressive action is also taken at the levee to restore sediment and soil and groundwater quality at both the Levee and the former Maloney Creek.

Actions in the Former Maloney Creek have significant impacts on the natural environment (See SEPA analysis below) and may outweigh any benefit from restoration measures more aggressive than natural recovery.

7.10.2 State Environmental Policy Act

Impacts to the natural and built environment under this alternative are similar to those described previously for Alternative PB2. Significant differences in terms of impacts are as follows (refer to Table 7-3 and Appendix A for more details and a comparison among alternatives). The tabulation below summarizes the remediation activities, significant impacts and mitigation.

Zone	PB3 Remediation Activity	Impacts / Mitigation
Aquatic Resource Zone – Levee	Same as SW4	Same as SW4
Aquatic Resource Zone – Former Maloney Creek Channel	Same as SW4	Same as SW4
Developed Zone – NE	Same as PB2, SW3 and SW4	Same as PB2, SW3 and SW4
Developed Zone – South	Same as PB1, PB2 and SW4	Same as PB1, PB2 and SW4
Developed Zone – NW	Same as PB2, adding: Excavating shallow smear zone	Similar to PB2
Railyard Zone	Same as PB2, except: Flushing free product (instead of skimming) Adding: Excavating TPH as well as surface metals	Same as PB2

7.10.2.1 Levee and River Sediments

This alternative includes the possible excavation of the levee. The impacts described here assume excavation of the levee. Excavating the levee and associated sediment to the cleanup levels results in major impacts to roads due to the need to construct an access road to the levee area. Moderate impacts are likely for flooding (risk for catastrophic flooding is low from July 1st through September 15th, but the risk is increased while the levee is down), runoff (temporary blockage of two storm drain culverts), surface water quality (potential for releases during construction), sediment (complete loss of resource, but expected natural recovery within a few seasons), aesthetics (unsightly construction and loss of riparian area), and noise (greater than 60 dBA during working hours), traffic (trucks), and aquatic resources (removal of riparian vegetation and coarse substrates resulting in short-term loss of salmonid habitat). Excavating the levee in increments as well as stockpiling sandbags to temporarily seal the breach can mitigate the flooding risk. Moderate impacts are likely for soil (loss of established topsoil along levee). Minor or temporary impacts can be expected for topography, air quality, odors, groundwater quality and quantity, river hydrology (coffer dam), surface water quality, land use (impacts to Critical Areas), habitat and wildlife (clearing of habitat and disturbance during construction), land use (institutional controls), housing (removal of one abandoned older house for the access road), and hazardous substances.

7.10.2.2 Former Maloney Creek Channel

Major adverse impacts are expected as a result of sediment excavation to habitat and wetlands in Maloney Creek. Approximately 0.5 acres of forested wetland habitat would be cleared during excavation, and an additional 0.4 acres cleared for installation of air sparing wells. Moderate adverse impacts are expected to sediment (loss of resource with slow natural recovery), noise (greater than 60dBA during working hours), and aquatic resources. A reduction in salmonid habitat and temporary loss of access to salmonid habitat would occur as a result of removal of surface sediment and use of the cofferdam. In addition, minor or temporary impacts are likely for topography, former Maloney Creek hydrology, runoff, and floods, traffic, and aesthetics.

7.10.2.3 Railyard

No major adverse impacts are expected for the combination of flushing, trenching, enhanced bioremediation, and surface soil excavation in this alternative. Moderate impacts are limited to noise (greater than 60 dBA during working hours). Minor or temporary impacts are expected for topography, air emissions, odors, groundwater quality and quantity, runoff, habitat and wildlife, aesthetics and historic structures, land use (institutional controls), hazardous substance exposure, roads, and traffic.

7.10.2.4 Proposed Specific Mitigation Measures

Proposed specific mitigation measures are similar to those described in Sec. 7.9.2.5 and include standard construction BMPs for the protection of soil and water, air quality, fish and wildlife, vegetation, aesthetic and historical resources, human health and public property, including construction timing restrictions, implemented under all alternatives. In addition, replacement of excavated soil with comparable material mitigates for soil impacts in the developed areas and the aquatic resource zones. Replacement of septic systems can mitigate the impact to the leach fields. Mitigation measures focusing on appropriate timing of work in the riverfront area mitigates against risk of flooding and hydrologic impacts. Compensatory wetland mitigation would be detailed in a Wetland Mitigation Plan to off-set impacts to the former Maloney Creek channel wetlands consistent with the requirements of the Skykomish Critical Areas Ordinance and the U.S. Army Corps of Engineers regulations. Impacts on land use from contaminated soil and groundwater can be mitigated by maintaining a clean soil cover at the surface, continuing to make public water available, and implementing institutional controls which will limit exposure and provide a mechanism for BNSF (or the Town with technical and financial assistance from BNSF) to safely manage contaminated soil and water encountered during construction activities on private and public properties.

7.10.2.5 Unavoidable Significant Impacts of Alternative PB3

Unavoidable significant impacts of Alternative PB3 include:

- Relatively high noise levels in town during working hours
- Increased truck traffic in the town of Skykomish
- 23-46 days of increased truck traffic on U.S. 2
- Road closures
- Effects to public services, housing, historic structures, and aesthetics
- Temporary loss of salmonid habitat

7.11 Alternative PB4

Alternative PB4 consists of:

- Excavating the smear zone, excavating sediment to cleanup levels, and enhancing bioremediation in the Levee Aquatic Resources Zone
- Enhancing biodegradation and excavating sediment to cleanup levels in the Former Maloney Creek Aquatic Resource Zone
- Excavating free product, and enhancing biodegradation in the NE Developed Zone
- Excavating all soils above cleanup levels in the South Developed Zone
- Excavating, flushing, or a combination of excavating and flushing free and residual product, excavating surface metals and the shallow smear zone and enhancing biodegradation in the NW Developed Zone
- Excavating surface metals and TPH, capping, flushing all free product, and enhancing biodegradation in the Railyard Zone

7.11.1 Model Toxics Control Act

Alternative PB4 meets cleanup standards in approximately 5 years. All free product and residual product are removed either by excavation or surfactant

flushing. Sediment is removed to cleanup levels at the Skykomish River and in the former Maloney Creek channel.

Federal (Nationwide 38) permitting is required for sediment removal along the levee.

This alternative, while technically feasible, is very disruptive to the community and environment given the extended reach of cleanup operations in the NW Developed Zone. Residents would need to be temporarily displaced during excavation and surfactant flushing operations near homes. Residual contamination above soil cleanup levels would remain, thereby necessitating institutional controls to ensure protection.

7.11.2 State Environmental Policy Act

Impacts to the natural and built environment under this alternative are similar to those described previously for Alternative PB3. Significant differences in terms of impacts are as follows (refer to Table 7-3 for more details and a comparison among alternatives). The tabulation below summarizes the remediation activities, significant impacts and mitigation.

Zone	PB4 Remediation Activity	Impacts / Mitigation
Aquatic Resource Zone – Levee	Same as PB3 and SW4, except: Excavating smear zone (instead of ozone sparge or flushing smear zone)	Same as PB3 and SW4, adding Flooding risk increased while levee down / <i>coffer dams, work during dry season</i> Increased traffic Temporary blockage of two storm drain culverts / <i>work during dry season, provide alternate temporary stormwater conveyance</i> Complete loss of sediment with recovery expected in a few seasons / <i>regrade to encourage sediment accumulation</i> One older house to be removed for access road / <i>provide temporary housing, replace after construction complete</i>

Aquatic Resource Zone – Former Maloney Creek Channel	Same as PB3, except: Excavating sediment to cleanup level (instead of to remediation level)	Same as PB3, adding: Increased traffic Clearing 1.1 acre forested wetland / <i>compensatory mitigation</i> Loss of green area in town (decreased wetland aesthetics) Long-term loss of salmonid habitat / <i>compensatory mitigation</i> Rerouting former Maloney Creek storm drainage could impact runoff / <i>re-design and construct drainage as necessary</i> Siltation / <i>use of construction BMPs, silt fences, hay bales, excavation during dry season, silt collection ponds</i> Loss of all sediment in an area of slow recovery Increased noise during working hours Coffer dam / <i>conduct work during dry season to reduce hydraulic impacts</i> Impacts on Critical Area
Developed Zone – NE	Same as PB3, except: Excavating free product	Same as PB3, adding: Increased noise during working hours Relocation of utilities Traffic: 48 trucks per day for a week
Developed Zone – South	Same as PB1, PB2, PB3 and SW4	Same as PB1, PB2, PB3 and SW4
Developed Zone – NW	Same as PB3, adding: Excavating residual product	Same as PB3 and SW4
Railyard Zone	Same as PB3, except: Flushing (instead of using trenches)	Generally same as PB3

7.11.2.1 Levee and River Sediments

This alternative calls for excavation of the levee to the remediation level and excavation of all sediment to cleanup levels. The impacts are similar to those of the excavation scenario for PB3.

7.11.2.2 Former Maloney Creek Channel

Major adverse impacts are expected from the excavation of all surface sediment to the cleanup level (in addition to enhanced bioremediation of smear zone) to aquatic resources, wetland and habitat, aesthetics, and traffic (12 truck trips per day for 1 week locally). Excavation to cleanup levels and installation of wells will include clearing of approximately 1.1 acre of forested wetland. In addition, major adverse impacts are expected for aesthetics of the wetland (loss of a valuable green area in town) and for aquatic resources (long-term loss of salmonid habitat). Moderate adverse impacts may be expected to runoff (due to the need to reroute the former Maloney Creek storm drainage), surface water quality (siltation), sediment (due to the loss of all

sediment in an environment of slow recovery), traffic, and noise (greater than 60 dBA during working hours for well installation for approximately 3 weeks). Minor or temporary impacts include topography, air emissions, odors, groundwater quality and quantity, hydrology (of Maloney creek), floods (use of coffer dam), land use (impacts on a Critical Area and institutional controls), and hazardous substance exposure.

7.11.2.3 Northeast Developed Zone

This alternative (excavation of free product) results in major adverse impacts to aesthetics (wells located in the street), noise (greater than 60 dBA during working hours for 3 weeks), public services (movement of utilities because of well installation in the street), and traffic (48 truck trips per day for a week locally). Minor or temporary impacts to soil, topography, air quality, odors, groundwater quantity and quality, floods, runoff, habitat and wildlife, land use, housing, traffic, hazardous substances, and roads.

7.11.2.4 Northwest Developed Zone

Adverse impacts under this alternative are similar to those for PB3 under the worst-case scenario, but impacts are major for housing and roads. Excavation of roads and septic systems will cause rerouting utilities as a result of excavation to the remediation level.

7.11.2.5 Railyard

The combination of flushing, free product excavation, surface soil excavation, and enhanced bioremediation in this alternative will result in major adverse impacts to traffic (trucks). Moderate adverse impacts may be expected to runoff (blockage of existing runoff from railyard to north side and to former Maloney Creek via culverts), noise (greater than 60 dBA during working hours), public services (possible impact to existing water mains), and roads. Minor or temporary impacts are possible to topography, air quality, odors, groundwater quality and quantity, habitat and wildlife, land use (institutional controls), aesthetics, and hazardous substances.

7.11.2.6 Proposed Specific Mitigation Measures

Proposed specific mitigation measures are similar to those described in Section 7.10.2.4 and include standard construction BMPs for the protection of soil and water, air quality, fish and wildlife, vegetation, aesthetic and historical resources, human health and public property, including construction timing restrictions, implemented under all alternatives. In addition, replacement of excavated soil with comparable material mitigates for soil impacts in the developed areas and the aquatic resource zones. Replacement of septic systems mitigates the impact to the leach fields. Mitigation measures focusing on appropriate timing of work mitigates against risk of flooding and hydrologic impacts in the aquatic zones. Compensatory wetland mitigation

would be detailed in a Wetland Mitigation Plan to off-set impacts to the former Maloney Creek channel wetlands consistent with the requirements of the Skykomish Critical Areas Ordinance and the U.S. Army Corps of Engineers regulations. Impacts on land use from contaminated soil and groundwater can be mitigated by maintaining a clean soil cover at the surface, continuing to make public water available, and implementing institutional controls which will limit exposure and provide a mechanism for BNSF (or the Town with technical and financial assistance from BNSF) to safely manage contaminated soil and water encountered during construction activities on private and public properties.

7.11.2.7 Unavoidable Significant Impacts of Alternative PB4

Unavoidable significant impacts of Alternative PB4 include:

- High and medium-term noise levels in town during working hours
- Much increased truck traffic in the town of Skykomish
- 47-94 days of increased truck traffic on U.S. 2
- Road closures
- Major effects to public services, housing (temporary relocations), historic structures (temporary relocations), and aesthetics (permanent changes to town character)
- Effects to surface water (runoff, water quality)
- Temporary loss of sediment with natural recovery over time
- Temporary loss of salmonid habitat.

7.12 Standard Alternative (STD)

Alternative STD consists of:

- Excavating the smear zone and excavating sediment to cleanup levels in the Levee Aquatic Resource Zone
- Excavating the smear zone and excavating sediment to cleanup levels in the Former Maloney Creek Aquatic Resource Zone
- Excavating free product and the smear zone in the NE Developed Zone

- Excavating all soil above cleanup levels in the South Developed Zone
- Excavating all soil above cleanup levels in the NW Developed Zone
- Excavating all soil above cleanup levels in the Railyard Zone

7.12.1 Model Toxics Control Act

The standard alternative requires excavation of all free product and soil exceeding cleanup levels and is, therefore, the only alternative that meets the cleanup standard without the need for institutional controls. While technically feasible and possessing the maximum levels of permanence protectiveness of all alternatives, the standard alternative requires the removal or destruction and replacement of all homes and infrastructure in identified excavation areas. These are major short-term consequences for the community.

Excavation of sediment in the levee and former Maloney Creek channel will result in short-term attainment of cleanup levels for soil and sediment at the expense of the existing natural habitat. Sediment and soil removal below the stream high water marks will require federal permitting (Nationwide 38).

7.12.2 State Environmental Policy Act

Impacts to the natural and built environment under this alternative are as follows (refer to Table 7-3 for more details and a comparison among alternatives). The tabulation below summarizes the significant impacts described in the text.

Zone	STD Remediation Activity	Impacts
Aquatic Resource Zone – Levee	Same as PB4	Same as PB4
Aquatic Resource Zone – Former Maloney Creek Channel	Excavating smear zone Excavating sediment	Similar to PB4, but more extensive
Developed Zone – NE	Excavating free product Excavating smear zone	Traffic: 185 trucks per day for 5 weeks; 3 trains per week for 4 weeks or 48 trucks per day for 5 weeks. Two to three houses would be impacted / <i>provide temporary housing, move then replace houses</i> Removal of 0.53 acres of topsoil and 6,080 cubic yards / <i>replace, regrade and revegetate</i>

		Impacts to stormwater flow / <i>divert stormwater around excavation</i> Increased noise / <i>limit working hours</i> Impacts to public services /
Developed Zone – South	Excavating all soil above cleanup levels	Same as PB4
Developed Zone – NW	Excavating all soil above cleanup levels	Similar to PB4 but more extensive.
Railyard Zone	Excavating all soil above cleanup levels	Similar to PB4, but more extensive. Excavation around main line railroad track will require rerouting the main line and utilities.

7.12.2.1 Levee and River Sediments

Excavating the levee and associated sediment to the cleanup level results in major impacts to roads and traffic. Locally approximately 200 truck trips would be required per day for 1 month for levee excavation in addition to 11 truck trips per day for 2 weeks for the sediment excavation. Moderate impacts are likely for flooding (risk for catastrophic flooding is low from July 1 to September 15, but the risk is increased while the levee is down), runoff (temporary blockage of two storm drain culverts), sediment (complete loss of resource, but expected natural recovery within a few seasons), aquatic resources (removal of riparian vegetation and coarse substrates resulting in short-term loss of salmonid habitat function), aesthetics (unsightly construction and loss of riparian area), and noise (greater than 60 dBA during working hours). Moderate impacts are likely for soil (loss of established topsoil along levee); however, these effects will be mitigated by replacement of excavated soil. Minor or temporary impacts can be expected for topography, air quality, odors, groundwater quality and quantity, river hydrology (cofferdam), surface water quality (potential for releases during construction), land use (impacts to Critical Areas), habitat and wildlife (clearing and disturbance), housing (razing of one abandoned older house for the access road), and hazardous substances.

7.12.2.2 Former Maloney Creek Channel

Excavation of all sediment and smear zone soil to cleanup levels results in impacts similar to those described for PB4, but notably more extensive.

7.12.2.3 Northeast Developed Zone

Excavation of soils in this zone to the cleanup levels result in major adverse impacts to housing, aesthetics, historic structures, and traffic. Approximately 185 truck trips per day for 5 weeks locally and possibly three trains per week for 4 weeks will be needed to transport excavated material for disposal. Two to three houses would be impacted. Moderate adverse impacts will occur to

soil (removal of 0.53 acre of topsoil disturbed and 6,080 cy removed and replaced), runoff (loss of infiltration area), noise (greater than 60 dBA during working hours), and public services. Minor or temporary adverse impacts can be expected for topography, air emissions, odors, groundwater quality and quantity, floods, habitat and wildlife, hazardous substances, and roads.

7.12.2.4 Northwest Developed Zone

Excavation of soils in this zone to the cleanup levels results in adverse impacts similar to those described for PB4.

7.12.2.5 Railyard

Excavation of all soils in this zone to the cleanup levels results in adverse impacts similar to those described for PB4, but considerably more extensive. Impacts to transportation and public services are major because excavation around the main line railroad track will require rerouting the main line and utilities that run along it.

7.12.2.6 Proposed Specific Mitigation Measures

Proposed specific mitigation measures include standard construction BMPs for the protection of soil and water, air quality, fish and wildlife, vegetation, aesthetic and historical resources, human health and public property, including construction timing restrictions, implemented under all alternatives. In addition, replacement of excavated soil with comparable material could mitigate for soil impacts in the developed areas and the aquatic resource zones. Replacement of septic systems could mitigate the impact to the leach fields. Mitigation measures focusing on appropriate timing of work mitigates against risk of flooding and hydrologic impacts in the aquatic zones. Excavating the levee in increments as well as stockpiling sandbags to temporarily seal the breach can mitigate the flooding risk. Compensatory wetland mitigation would be detailed in a Wetland Mitigation Plan to off-set impacts to the former Maloney Creek channel wetlands consistent with the requirements of the Skykomish Critical Areas Ordinance and the U.S. Army Corps of Engineers regulations. Short-term impacts on land use from contaminated soil and groundwater (while the remedy is being implemented over 5+ years) can be mitigated by maintaining a clean soil cover at the surface, continuing to make public water available, and implementing institutional controls which will limit exposure and provide a mechanism for BNSF (or the Town with technical and financial assistance from BNSF) to safely manage contaminated soil and water encountered during construction activities on private and public properties. These institutional controls could be removed once the cleanup is completed.

7.12.2.7 Unavoidable Significant Impacts of Standard Alternative

Unavoidable significant impacts of the Standard Alternative include:

- Relatively high noise levels in town during working hours
- Dramatically increased truck traffic in the town of Skykomish
- 73-146 days of increased on U.S. 2
- Road closures
- Effects to public services, housing (temporary relocations), historic structures (temporary relocations), and aesthetics (permanent change to town character and character of former Maloney Creek area)
- Effects to surface water (water quality)
- Temporary loss of sediment with natural recovery over time
- Temporary loss of salmonid habitat.

7.13 Summary of Remedial Alternatives Evaluation

This section summarizes the evaluation of remedial alternatives provided in Sections 7.3 to 7.12 in terms of MTCA requirements and the overall environmental impact analysis.

Table 7-5 presents a summary of significant unavoidable adverse impacts relative to the No Action Alternative (following mitigation). In general, the severity or intensity of construction-related impacts on the built environment increases and the severity or intensity of impacts from hazardous substances on the natural environment decreases with more invasive remedial alternatives.

Table 7-6 provides a summary of the remedial alternatives, including the cleanup action proposed for each cleanup zone and the associated costs. Costs are based on the detailed calculations provided in Appendix L.

7.13.1 No Action

The No Action alternative does not satisfy MTCA threshold requirements for meeting cleanup standards.

No Action would not significantly affect the built environment. No roads, buildings or utilities would be physically damaged or disrupted. The long-term presence of contamination could deter future investment in the built

environment and the community. The natural environment would continue to be significantly and adversely impacted by the contamination present.

7.13.2 Standard Alternative

The Standard Alternative removes all material from the site that exceeds cleanup levels. Following excavation, groundwater returns to protective levels by natural attenuation. While technically feasible and achieving a high level of protectiveness and permanence, this alternative would cause severe disruption to the community and local ecology. Residents would be displaced for at least several months depending on how the excavation work is phased. Houses and other buildings would be moved or demolished and utilities would need to be moved or demolished and ultimately replaced. The main track of the BNSF rail line would need to be moved. The wetland ecology of the former Maloney Creek channel would be destroyed. Restoration measures at the former Maloney Creek channel could eventually create a biologically healthy ecology; however, the restoration of a wetland area with diverse and robust wetland ecology equivalent to what exists today cannot be ensured.

This alternative would yield a high level of protection through permanent removal of contamination from the site. Short-term risks could be managed with engineering controls commonly practiced at construction and hazardous material cleanup projects. Based on prior community involvement, community acceptance of this alternative may vary because of the substantial disruption to residents and facilities during implementation of this alternative. This should be further evaluated during the formal public comment period for the FS/EIS.

7.13.3 SW Alternatives

The SW alternatives are designed for a conditional point of compliance where groundwater discharges to surface water (Skykomish River). Adoption of any SW alternative and a conditional point of compliance at the River require the agreement of affected property owners. Approximately 25 properties are affected by contaminated groundwater (see Appendix M).

MTCA Evaluation Summary – As a group, the SW alternatives focus on groundwater cleanup through removal of free product and *in situ* bioremediation of groundwater before it affects the Skykomish River and former Maloney Creek. The need for and duration of bioremediation of groundwater depends on the effect removing free product has on reducing groundwater impacts to the River. Alternatives SW1 and SW2 will require long-term bioremediation of groundwater in the levee because they rely on passive recovery of free product upgradient of the barrier wall in the NW Developed Zone. Alternatives SW3 and SW4 ultimately transition from enhanced bioremediation to natural attenuation. Both offer more permanent

and effective removal of free product and associated smear zone soil in the NW Developed Zone.

Soil cleanup is achieved, in all cases, by removing surface soil exceeding cleanup levels and applying institutional controls to protect against exposures to contaminated soil remaining at depth. As mentioned above, SW3 and SW4 remove greater quantities of smear zone soil contamination than SW1 and SW2. Contaminated soil remaining at depth is isolated under a protective layer of clean overburden soil. The institutional controls protect against exposures to this material by obligating BNSF to assist property owners and other affected entities (e.g., utilities, the town of Skykomish) with managing contaminated soil and groundwater from construction work. Current institutional controls prohibit new well installation in contaminated areas.

All of the SW alternatives protect human health and the environment. Alternatives SW3 and SW4 are more permanent than SW1 and SW2 through removal of greater amounts of material, particularly in the NW and South Developed Zones (Table 7-2).

SEPA Evaluation Summary – Under SW1 and SW2, significant unavoidable impacts from construction-related activities to the natural environment are generally negligible. Alternatives SW3 and SW4 involve excavation in the aquatic habitat zone thereby generating some unavoidable impacts to riparian areas, sediment and salmonid habitat. Over time, the habitat will recover but for a period of years will be degraded. The SW4 alternative additionally leads to major adverse impacts to the former Maloney Creek wetland and riparian area. These impacts can be mitigated through appropriate compensatory wetland reconstruction.

The major unavoidable significant adverse impacts of the SW alternatives relative to the No Action Alternative are associated with the built environment. Noise and traffic are inevitable effects of most SW alternatives. In general, the level of impact increases with the extent and length of the cleanup project and the aggressiveness of the cleanup method. For alternatives with extensive excavation needs in several cleanup zones (e.g., SW3 and SW4), the traffic impacts due to truck traffic in town and down U.S. 2 can be major. In general, the small size of the NE and South Developed Zones relative to the NW Developed Zone mean that their relative contribution to these impacts is less. Details on the extent of impacts are discussed in Appendix A.

Impacts to utilities/public services, housing, roads, aesthetics, and historic structures are another potentially major impact in the developed zones. Alternatives SW1 and SW2 entail installation of treatment or recovery systems and excavation of surface soil limited to accessible areas. This

results in an unavoidable adverse nuisance and disturbance factor to residents and visitors due to activities in yards, roads, and near dwellings. These impacts are relatively short-term and limited to the construction period.

SW3 and SW4 involve progressively more extensive actions in the NW Developed Zone. The area of excavation is significantly expanded to remove free product and, in the case of SW4, shallow smear zone soil. Property surrounding existing structures (buildings) is impacted by deeper excavation work and construction/operation of surfactant flushing equipment (wells, piping). These options lead to more severe and longer-lasting unavoidable adverse impacts due to the need for property access, excavation and construction work on residential and other properties, and the likely need for temporary relocation of residents during such operations.

7.13.4 PB Alternatives

The PB alternatives assume a conditional point of compliance for groundwater located at the BNSF property boundary rather than at the River.

MTCA Evaluation Summary – As with the SW alternatives, the PB alternatives focus on attainment of the groundwater cleanup standard through removal of free product and either natural attenuation, enhanced bioremediation or a combination of the two. The need for and duration of bioremediation of groundwater depends on the effect of removing free product has on reducing groundwater impacts at the BNSF property boundary.

All of the PB alternatives achieve soil cleanup by removing surface soil and subsurface soil to varying degrees after which institutional controls are invoked to protect against exposures to remaining contaminated soil at depth. Contaminated soil remaining at depth after the cleanup actions is isolated under a protective layer of clean overburden soil. The institutional controls protect against exposures to this material by obligating BNSF to assist property owners and other affected entities (e.g., utilities, the town of Skykomish) with managing contaminated soil and groundwater from construction work. Alternatives PB3 and PB4 achieve greater permanence with respect to soil cleanup by removing or treating substantially greater amounts of contaminated soil in the NW Developed Zone (Table 7-2).

Cleanup of the Northeast Developed Zone is more likely to achieve cleanup standards due to the presence of more biodegradable petroleum constituents. Cleanup of the South Developed Zone is more likely to achieve cleanup standards due to the limited source area and the small area of concern.

All of the PB alternatives protect human health and the environment. Alternatives PB3 and PB4 are more permanent than PB1 and PB2 through removal of greater amounts of material, primarily in the NW Developed Zone (Table 7-2).

SEPA Evaluation Summary – The PB alternatives similarly have negligible unavoidable impacts to the natural environment, except where excavation of the aquatic zones under alternatives PB3 and PB4 result in unavoidable impacts to sediment and salmonid habitat. Impacts to the wetland area are also associated with excavation options, but are considered mitigated through appropriate compensatory wetland mitigation.

The impacts to the built environment are the same as those from the SW alternatives. Details on the extent of impacts are discussed in Appendix A. However, unlike the SW alternatives, buildings in the historic zone would require temporary relocation under alternative PB4. This alternative leads to permanent, major impacts to the overall aesthetic character of the town; therefore, it is considered to have the most severe impact in this SEPA evaluation.